

Table of Contents

	Page
Chapter One—Road Design Manual Introduction	
Introduction.....	1-1
Chapter Two—Design Controls	
2.1 Objectives of Design Controls.....	2-1
2.2 Levels of Service.....	2-2
2.3 Speed-Related Controls.....	2-3
2.3.1 Operating Speed	2-3
2.3.2 Running Speed	2-3
2.3.3 Design Speed.....	2-3
2.4 Traffic-Related Controls	2-4
2.4.1 Traffic Volumes.....	2-4
2.4.2 Traffic Composition	2-5
2.4.3 Traffic Projections.....	2-5
2.4.4 Traffic Data Documentation.....	2-5
2.4.5 Highway Capacity	2-6
2.4.6 Design Vehicles.....	2-6
2.5 Other Design Controls.....	2-7
2.5.1 Terrain Characteristics	2-7
2.5.2 Functional Classification	2-7
2.5.2.1 Roadway Types within the Classification System	2-8
2.5.3 Manual Application.....	2-9
2.5.4 Access Control	2-10
2.5.5 Pedestrians.....	2-11
2.5.6 Bicycle Facilities	2-11
2.5.7 Economics	2-11
2.5.8 Safety	2-12
2.5.9 Environment	2-14
Chapter Three—Design Standards	
3.1 Basis for Standards.....	3-1
3.1.1 AASHTO Policies and Guides	3-1
3.1.2 Application of Standards	3-2
3.1.3 Departure from Standards.....	3-3
3.1.4 Determination of Standards.....	3-4
3.2 Standards Based on Design Speed	3-4
3.2.1 Selection of Design Speed	3-4

3.2.2	Curvature and Superelevation	3-7
3.2.3	Stopping Sight Distance	3-7
3.2.4	Passing Sight Distance	3-8

3.3 Standards Based on Traffic Volumes 3-8

3.3.1	Number of Lanes	3-8
3.3.2	Surfaced Lane Widths	3-9
3.3.3	Shoulder Width.....	3-10
3.3.4	Surfaced Shoulder Width	3-12
3.3.5	Side Slopes	3-12
3.3.6	Horizontal Clearance and Clear Zone	3-12
3.3.6.1	Horizontal Clearance.....	4-6
3.3.6.2	Clear Zone.....	4-11
3.3.7	Grades.....	3-13
3.3.8	Bridges.....	3-13
3.3.9	Medians	3-13

Chapter Four—Cross Section Elements

4.1 Surfacing Elements..... 4-1

4.1.1	Surface Type.....	4-1
4.1.2	Lane and Shoulder Widths	4-1
4.1.3	Median Shoulders—Divided Highways.....	4-2
4.1.4	Cross Slopes	4-2
4.1.5	Shoulder Cross Sections	4-3
4.1.6	Curbs	4-5

4.2 Grading Cross Section..... 4-5

4.2.1	Subgrade Cross Slopes	4-5
4.2.2	Subgrade Width.....	4-6
4.2.3	Subgrade Widening for Guardrail	4-6
4.2.4	Side Slopes	4-6
4.2.4.1	Side Slopes within the Clear Zone	4-6
4.2.4.2	Front Slopes.....	4-11
4.2.4.3	Back Slopes.....	4-12
4.2.4.4	Transverse Slopes.....	4-12
4.2.5	Roadside Ditches	4-12
4.2.5.1	Trapezoidal Ditch.....	4-13
4.2.5.2	V-Ditch.....	4-13

4.3 Medians..... 4-13

4.3.1	Flush Medians	4-16
4.3.2	Curbed Medians.....	4-16
4.3.3	Depressed Medians.....	4-16
4.3.4	Median Barriers	4-17
4.3.5	Median Openings.....	4-17

Chapter Five—Alignment and Superelevation

5.1 Horizontal Alignment..... 5-1

5.1.1	General Criteria	5-1
5.1.2	Control Line Locations.....	5-2
5.1.3	Types of Curves.....	5-3
5.1.4	Sight Distance on Horizontal Curves	5-4
5.1.4.1	Stopping Sight Distance	5-4
5.1.4.2	Passing Sight Distance	5-5
5.1.4.3	Decision Sight Distance	5-5
5.1.5	Coordination with Vertical Alignment.....	5-6
5.2	Vertical Alignment.....	5-6
5.2.1	General Criteria	5-6
5.2.2	Maximum Grades	5-6
5.2.3	Minimum Grades.....	5-7
5.2.4	Minimum Ditch Grades	5-7
5.2.5	Critical Length of Grade.....	5-7
5.2.6	Climbing Lane Criteria.....	5-8
5.2.7	Vertical Curves.....	5-8
5.2.8	Vertical Curve Design	5-8
5.2.9	Passing Sight Distance Measurement.....	5-9
5.2.10	Gradeline Elevations	5-10
5.2.11	Urban Grade Design	5-12
5.3	Superelevation	5-13
5.3.1	Rates of Superelevation.....	5-13
5.3.2	Superelevation Transition.....	5-14
5.3.3	Axis of Rotation	5-15

Chapter Six—Drainage and Erosion Control

General Policies and Criteria	6-1
Design Responsibilities	6-1
Storm Design Frequency	6-2
Risk Analysis.....	6-3
Minimum Size of Culverts	6-4
Documentation of Drainage Analysis.....	6-4
Surface Runoff Determination	6-4
Rational Method	6-5
U.S.G.S. Method	6-7
Culvert Pipe Size Determination	6-8
New Castle County Stormwater Management	6-8
Storm Drain Design	6-9
Runoff Quantities	6-9
Ponding Limits on Roadway	6-10
Inlet Spacing.....	6-10
Pipe Sizing.....	6-11
Gradients	6-12
Hydraulic Gradient	6-12

Conflict with Underground Utilities.....	6-15
Hydraulic Analysis of Inlet Grates	6-16
Summary of Design Steps	6-17
Use of Storm Drainage Design Sheet.....	6-19
Sample Design Problem	6-21
Design Steps	6-21
Inlet 1.....	6-22
Inlet 2.....	6-23
Inlet 3.....	6-24
Inlet 4.....	6-26
Inlet 5.....	6-27
Inlet 7.....	6-28
Inlet 8.....	6-29
Inlet 6.....	6-30
Friction Head Losses	6-32
Hydraulic Gradient Summary.....	6-33
Gutter Flow Depths and Spreads.....	6-33
Hydraulics of Inlet 2.....	6-34
Hydraulics of Inlet 7.....	6-35
Probable Depth at Sumps	6-36
Inlet 1.....	6-36
Inlet 3.....	6-36
Inlet 5.....	6-37
Inlet 8.....	6-37
Subsurface Drainage	6-38
Pipe Design	6-39
Types of Pipe.....	6-39
Strength Requirements	6-41
Culvert End Section Treatment	6-42
Multiple Pipe Installations.....	6-43
Skewed Installations	6-43
Culvert Length Measurement	6-44
Permanent Erosion Control.....	6-44
Vegetation	6-44
Topsoil.....	6-45
Seeding	6-45
Mulching	6-45
Sodding.....	6-45
Ditch Treatment.....	6-46
Fill Slope Protection	6-46
Other Erosion Control Devices	6-46
Culvert Riprap	6-47
Energy Dissipators.....	6-47
Temporary Erosion and Sediment Control.....	6-47
Dikes.....	6-47
Swales.....	6-48

Stone Outlet Structure	6-48
Level Spreader.....	6-49
Sediment Traps.....	6-49
Storm Inlet Sediment Trap	6-49
Grade Stabilization Structures	6-50

Chapter Seven—Intersections

7.1 General Considerations.....	7-1
7.1.1 Types of Intersections.....	7-2
7.1.2 Levels of Service	7-2
7.1.3 Alignment.....	7-2
7.1.4 Profile	7-2
7.1.5 Frontage Road Intersections	7-3
7.1.6 Distance Between Intersections.....	7-3
7.2 Turning Movements	7-3
7.2.1 Design Vehicles.....	7-4
7.2.2 Edge-of-Traveled-Way Designs	7-6
7.2.3 Pavement Widths for Turning Roadways.....	7-7
7.3 Channelization	7-9
7.3.1 Purpose	7-9
7.3.2 Design Principles.....	7-9
7.3.3 Islands.....	7-12
7.4 Sight Distance.....	7-14
7.4.1 Minimum Sight Distance Triangle	7-14
7.4.2 Intersection Maneuvers	7-16
7.5 Auxiliary Turning Lanes.....	7-16
7.5.1 Minimum Left-turn Lengths.....	7-20
7.6 Median Openings	7-20
7.6.1 Control Radii	7-27
7.6.2 Shapes of Median Ends	7-27
7.6.3 Lengths of Median Openings	7-28
7.6.4 Desirable Median Opening Designs for Left Turns	7-28
7.6.5 Median Widths for Left-Turn Lanes	7-29
7.6.6 Median Openings for U-Turns	7-30
7.7 Traffic Control Devices	7-30
7.7.1 Traffic Signals	7-30
7.7.2 Pavement Marking and Signing	7-30
7.8 Access Control Guidelines	7-32
7.8.1 Standards	7-32
7.8.2 Guidelines—Entrances	7-33
7.8.3 Guidelines—Crossovers	7-33

7.8.4	Public Awareness	7-34
-------	------------------------	------

Chapter Eight—Traffic Services

8.1	General Criteria.....	8-1
8.2	Design Principles.....	8-2
8.2.1	Uniformity	8-2
8.2.2	Placement	8-2
8.2.3	Operation	8-2
8.2.4	Maintenance	8-2
8.2.5	Consistency	8-3
8.3	Responsibilities.....	8-3
8.3.1	Transportation Solutions	8-3
8.3.1.1	Traffic Section.....	8-4
8.3.1.2	Safety Section.....	8-4
8.4	Implementation Guidelines.....	8-4
8.4.1	Signs	8-4
8.4.2	Pavement Markings	8-5
8.4.3	Traffic Signals	8-5
8.4.4	Islands.....	8-6
8.4.5	Maintenance of Traffic During Construction	8-6
8.4.6	Other Traffic Controls	8-7
8.5	Highway Lighting	8-7
8.5.1	Objectives	8-7
8.5.2	Design Responsibilities	8-7
8.5.3	General Warrants and Considerations	8-7
8.5.4	General Lighting Design Considerations	8-8
8.6	Signing and Striping Guidelines.....	8-9

Chapter Nine—Pavement Selection

9.1	Design Responsibility.....	9-1
9.1.1	Soil Survey/Pavement Evaluation Request	9-1
9.1.2	Soil and Pavement Design Report.....	9-2
9.1.3	Pavement Selection	9-2
9.2	Pavement Terminology	9-3
9.3	Pavement Design Factors	9-4
9.3.1	Pavement Design Life	9-6
9.3.2	Pavement Performance	9-6
9.3.3	Traffic	9-6
9.3.4	Roadbed Soil	9-6
9.3.5	Paving Materials.....	9-7

9.3.5.1	Flexible Pavements	9-8
9.3.5.2	Rigid Pavements.....	9-8
9.3.6	Temperature Changes.....	9-9
9.3.7	Drainage	9-9
9.3.8	Reliability	9-9
9.3.9	Life-Cycle Costs.....	9-10
9.3.10	Shoulder Design	9-10
9.4	Design for New Construction or Reconstruction.....	9-10
9.4.1	Design Variables	9-10
9.4.2	Performance Criteria	9-10
9.4.3	Materials Properties for Structural Design	9-11
9.4.4	Pavement Structural Characteristics.....	9-11
9.4.5	Reinforcement Variables	9-11
9.5	Structural Design for Flexible Pavements.....	9-12
9.5.1	Subbase Course	9-12
9.5.2	Base Course	9-12
9.5.3	Surface Course.....	9-12
9.5.4	Structural Number (SN)	9-13
9.5.5	Layer Coefficients	9-13
9.5.6	Minimum Lift Thickness	9-14
9.5.7	Temporary Pavements	9-14
9.6	Design for Rigid Pavements.....	9-14
9.6.1	Subbase—Effective Modulus of Subgrade Reaction	9-15
9.6.2	Pavement Slab Thickness	9-15
9.6.3	Joints.....	9-15
9.6.3.1	Joint Types	9-15
9.6.3.2	Joint Geometry	9-16
9.6.4	Reinforcement Design	9-16
9.7	Pavement Design for Rehabilitation of Existing Pavements	9-16
9.7.1	Rehabilitation Concepts.....	9-16
9.7.2	Types of Distress	9-18
9.7.2.1	Asphalt Pavements	9-18
9.7.2.2	Concrete Pavements	9-18
9.7.3	Drainage Survey	9-19
9.7.4	Restoration.....	9-20
9.7.4.1	Full-depth Repair.....	9-20
9.7.4.2	Partial-depth Repair.....	9-21
9.7.4.3	Slab Stabilization and Slab Jacking.....	9-21
9.7.4.4	Diamond Grinding, Grooving and Pavement Milling.....	9-22
9.7.4.5	Pressure Relief Joints	9-22
9.7.4.6	Load Transfer Restoration.....	9-22
9.7.4.7	Joint and Crack Sealing	9-23
9.7.4.8	Surface Treatments.....	9-23
9.7.4.9	Subdrainage Improvements	9-23
9.7.4.10	Shoulder Improvements	9-24
9.7.5	Recycling.....	9-24

9.7.5.1	Recycling Rigid Pavements.....	9-24
9.7.5.2	Surface Recycling of Bituminous Pavements	9-25
9.7.5.3	In-Place Recycling of Bituminous Pavements	9-25
9.7.5.4	Hot-Mix Recycling of Bituminous Pavements.....	9-25
9.7.6	Resurfacing.....	9-25
9.7.6.1	Types of Overlays and Their Functions	9-26

Chapter Ten — Miscellaneous Design

10.1	Context Sensitive Design	10-1
10.1.1	Types of Projects	10-1
10.1.2	Design Standards	10-2
10.1.3	Operational Consistency.....	10-3
10.1.4	Design Criteria.....	10-3
10.1.5	Design Controls	10-3
10.1.5.1	Functional Classification.....	10-4
10.1.5.2	Speed Selection	10-4
10.1.5.3	Traffic Considerations	10-5
10.1.5.4	Level of Service	10-6
10.1.6	Highway Geometric Elements—Design and Safety Considerations.....	10-6
10.1.6.1	Horizontal Alignment.....	10-6
10.1.6.2	Vertical Alignment.....	10-7
10.1.6.3	Sight Distance	10-7
10.1.6.4	Cross Section Elements	10-8
10.1.6.5	Intersections	10-10
10.1.7	Maintainability	10-10
10.2	Traffic Calming.....	10-10
10.3	Traffic Barriers	10-11
10.3.1	Design Options	10-11
10.3.2	Guidelines.....	10-12
10.3.3	Longitudinal Barriers.....	10-12
10.3.4	Barrier Placement	10-14
10.3.4.1	Lateral Offset.....	10-15
10.3.4.2	Terrain Effects.....	10-15
10.3.4.3	Flare Rate	10-16
10.3.4.4	Length of Need.....	10-16
10.3.4.5	Approach Barriers for Opposing Traffic	10-18
10.3.4.6	Roadside Slopes for Approach Barriers	10-18
10.3.5	Median Barriers	10-19
10.3.6	Impact Attenuators	10-20
10.4	Curbs.....	10-21
10.4.1	Types of Curb	10-21
10.4.2	Placement of Curb	10-21
10.4.2.1	Curbs at Development Entrances	10-22
10.4.2.2	Curbs at Commercial Entrances	10-22
10.4.3	Access for the Disabled	10-22
10.5	Right-of-Way	10-22

10.5.1	Right-of-Way Configuration	10-23
10.5.2	Easements	10-24
10.5.3	Right-of-Way Monuments.....	10-24
10.6	Fencing.....	10-24
10.7	Utility Adjustments.....	10-25
10.7.1	Survey Plans	10-25
10.7.2	Preliminary Plans.....	10-25
10.7.3	Semi-Final Plans.....	10-26
10.7.4	P.S. and E. Plans.....	10-26
10.8	Sidewalks	10-26
10.8.1	Goals and Objectives.....	10-26
10.8.2	Regulatory Requirements	10-27
10.8.3	Design Approach	10-28
10.8.4	Guidelines for Assessing the Need and Criteria	10-28
10.8.5	Warrants	10-30
10.8.6	Design Guidance for Safe Pedestrian Circulation	10-31
10.8.7	Pedestrian Accident History	10-32
10.8.8	Existing Site Accommodations	10-32
10.8.9	Placement	10-32
10.8.10	Maintenance Responsibility	10-33
10.8.11	Reminders.....	10-34
10.8.12	Funding Alternatives	10-35
10.9	Bicycle Facilities.....	10-35
10.9.1	Facility Selection	10-37
10.9.2	Facility Types	10-37
10.9.2.1	Design Approach.....	10-39
10.9.3	Shared Roadway	10-39
10.9.4	Signed Shared Roadway.....	10-40
10.9.5	Bike Lanes	10-41
10.9.5.1	Intersections with Bike Lanes	10-43
10.9.6	Shared Use Path.....	10-43
10.9.6.1	Separation Between Shared Use Paths and Roadways.....	10-44
10.9.6.2	Width and Clearance	10-45
10.9.6.3	Design Speed.....	10-45
10.9.6.4	Grades.....	10-46
10.9.6.5	Horizontal Alignment.....	10-46
10.9.6.6	Sight Distance	10-47
10.9.6.7	Intersections	10-48
10.9.6.8	Restriction of Motor Vehicle Traffic.....	10-49
10.9.6.9	Other Design Issues.....	10-49
10.10	Bus Stops.....	10-49
10.10.1	Location Criteria.....	10-50
10.10.2	Bus Stop Design	10-50
10.11	Park-and-Ride Lots	10-54

10.11.1	Location.....	10-60
10.11.2	Design.....	10-61
10.11.3	Access.....	10-61
10.11.4	Internal Circulation.....	10-62
10.11.5	Buses	10-63
10.11.6	Kiss-and-Ride Facilities	10-63
10.11.7	Pedestrians.....	10-63
10.11.8	Bicycles and Motorcycles.....	10-63
10.11.9	Disabled.....	10-63
10.11.10	Parking Dimensions and Lot Layout.....	10-63

Appendix A — Landscaping and Reforestation Act Implementation

A1.0	Introduction.....	A-1
A2.0	Purpose	A-2
A3.0	Definitions.....	A-2
A4.0	Procedures	A-3
A4.1	Mitigation and Needs Analysis	A-3
A4.1.1	No Removal or Cutting of Existing Trees.....	A-5
A4.1.2	Removal of Existing Shade Trees	A-5
A4.1.3	Tree Mitigation.....	A-5
A4.1.4	Removal of 10 or Fewer Trees	A-5
A4.1.5	Removal of 10 to 49 Trees	A-5
A4.1.6	Removal of 50 Trees or More	A-6
A4.2	Inability to Meet Requirements for Landscaping or Reforestation	A-6
A4.2.1	Off-Site Planting	A-6
A4.2.2	Fee-in-Lieu	A-7
A4.3	Existing Tree Protection and Maintenance.....	A-7

Figures

No.	Title	Page
2-1	Guidelines for Selection of Design Levels of Service.....	2-3
2-2	Functional Classification	2-7
3-1	Corresponding Design Speeds in US Customary and Metric Units	3-2
3-2	Design Exception Request.....	3-5
3-3	Typical Section Nomenclature	3-11
3-4	Design Control Checklist	3-14
3-5	Design Criteria Form	3-15
4-1	Pavement Cross Slopes for Traveled Way	4-2
4-2	Typical Cross Slopes	4-4
4-3	Cross Section Side Slopes	4-9
4-4	Side Slope Criteria.....	4-10
4-5	Trapezoidal Ditch Section	4-14
4-6	V-Ditch Section	4-15
5-1	Minimum Radius for Open Highway Conditions and Superelevation Rate of 4%	5-3
5-2	Minimum Radius for Open Highway Conditions and Superelevation Rate of 6%.....	5-3

5-3	Restricted Passing Sight Distance Criteria	5-10
5-4	Types of Vertical Curves.....	5-11
5-5	Criteria for Crest Vertical Curve Design.....	5-12
5-6	Criteria for Sag Vertical Curve Design	5-12
5-7	Runoff Locations that Minimize Vehicle Lateral Motion	5-15
5-8	Superelevation Runoff Elements	5-16
5-9	Minimum Superelevation Runoff and Tangent Runout Lengths (US Customary)	5-17
5-10	Minimum Superelevation Runoff and Tangent Runout Lengths [Metric]	5-17
5-11	Superelevation Attainment Traveled Way Revolved about Centerline.....	5-18
5-12	Superelevation Attainment Traveled Way Revolved about Inside and Outside Edge	5-19
5-13	Superelevation Attainment Traveled Way with Straight Cross Slope.....	5-20
7-1	Design Vehicle Turning Terminology.....	7-4
7-2	Minimum Turning Radii for Selected Design Vehicles	7-6
7-3	Minimum Radii at Inner Edge of Traveled Way for Intersection Curves – Free Flow	7-6
7-4	Intersection Edge-of-Traveled Way Layout Using Simple Curves	7-7
7-5	Intersection Edge-of-Traveled Way Design Layout using 3-Centered Compound Curves.....	7-8
7-6	Design Widths for Turning Roadways (US Customary).....	7-10
7-7	Design Widths for Turning Roadways [Metric].....	7-11
7-8	Typical Island Layout - Rural Areas	7-13
7-9	Typical Island Layout - Urban Areas	7-14
7-10	Sight Distance Triangles-Elements for At-Grade Intersections	7-15
7-11	Minimum Stopping Sight Distance for Turning Roadways at Intersections	7-16
7-12	Guide for Need for Left-Turn Lanes on Two-Lane Highways.....	7-19
7-13	Typical Turning Lane Design For Two-Lane Two-Way Roadways.....	7-21
7-14	Graphical Guide for Left-Turn Lane Need-40-mph [60-km/h] Operating Speed	7-22
7-15	Graphical Guide for Left-Turn Lane Need-50-mph [80-km/h] Operating Speed	7-23
7-16	Graphical Guide for Left-Turn Lane Need-60-mph [100-km/h] Operating Speed	7-24
7-17	Auxiliary Lane Design (Right And Left Turn Lane) Open Roadway Conditions.....	7-25
7-18	Minimum Deceleration Lengths (Without Taper) for Design of Exit Lanes – Urban Locations	7-26
7-19	Minimum Acceleration Lengths (Without Taper) for Design of Entering Lanes – Urban Locations	7-26
7-20	Preferred Median End Shapes Based on Median Width	7-28
7-21	Median Nose Design Alternatives	7-31
7-22	Desired Design Dimensions for Median Openings Using Bullet-Nose Ends	7-32
7-23	Typical Crossover Design for U-turns and Minor Intersections on Rural Divided Roadways	7-35
8-1	Signing Guide—Junction of Dual Route/Signalized Road	8-10
8-2	Signing Guide—Junction of Dual Route/Major to Minor Stop Road	8-11
8-3	Signing Guide—Junction of Two Routes/Two-Way Signalized Road	8-12
8-4	Signing Guide - Crossovers.....	8-13
8-5	Typical Intersection Pavement Markings	8-14
8-6	Typical Lane Reduction Transition Markings and Signing – Typical Multi-Lane, Two-Way Markings with Single Lane, Two-Way Left Turn Channelization	8-15
8-7	Typical Pavement Markings at Railroad-Highway Grade Crossing	8-16
8-8	Typical One Way and Divided Highway Marking Applications	8-17
8-9	Typical Expressway/Freeway Acceleration and Deceleration Lane Pavement Markings.....	8-18
8-10	Typical Entrance and Exit Ramp Pavement Markings.....	8-19
8-11	Guidelines for Advance Placement of Warning Signs (US Customary).....	8-20

8-12	Guidelines for Advance Placement of Warning Signs [Metric]	8-20
9-1	Pavement Terminology	9-5
9-2	Layer Coefficients	9-14
9-2	Lift Thickness.....	9-14
10-1	Guardrail Warrants for Embankments.....	10-13
10-2	Dynamic Guardrail Deflection	10-16
10-3	Approach Barrier Layout Variables	10-17
10-4	Approach Barrier Layout for Opposing Traffic.....	10-19
10-5	Median Barrier Warrants for High-Speed Divided Highways	10-20
10-6	Typical Bike Lane Cross Sections.....	10-42
10-7	Cross Section of Two-way Shared Use Path on Separated Right-of-Way.....	10-44
10-8	Desirable Minimum Radii for Paved Shared Use Paths	10-47
10-9	Minimum Radii for Paved Shared Use Paths	10-47
10-10	Bus Stop Placement.....	10-53
10-11	Street-Side Bus Stop Designs.....	10-55
10-12	Typical Dimensions for On-Street Bus Stops.....	10-56
10-13	Typical Bus Bay Layout.....	10-57
10-14	Typical Bus Bay Dimensions	10-57
10-15	Partial Open Bus Bay	10-58
10-16	Queue Jumper Bus Bay	10-58
10-17	Nub Bus Bay	10-59
10-18	Typical Car Parking Dimensions.....	10-64
10-19	Park-and-Ride Access Configuration	10-65
10-20	Example of Kiss-and-Ride Parking Lot	10-66
10-21	Stall Layout Elements for Standard Vehicle	10-67
10-22	Stall Dimensions for Standard Vehicle (Car).....	10-68
A-1	Reforestation Site Stocking	A-8
A-2	Landscaping and Reforestation Act Decision Making Flow Chart.....	A-9
A-3	Landscaping and Reforestation Checklist	A-10